

Environmental assessment of trace metals contamination near former french uranium mines

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Heavy metals pollution is particularly problematic due to the persistence and toxicity of these contaminants (Adriano, 2001). Soil behaves as a sink for heavy metals emitted by anthropic activities. Uranium mining produces tailings, contaminated waste rocks and heap-leach residues accumulated in the mine site. The sulphides present in the ore can be oxidised, causing acidification of water and release of metals. Different elements can be emitted in the mine environment like As, Cu, Pb (Lottermoser *et al* 2005). The aim of this study is to investigate the distribution of trace metals emitted in the environment around French uranium former mines. In this work, two different former French uranium mines are considered: Bertholène and St Alban sur Limagnole. At Bertholène, ore was treated with *in situ* heap leaching in order to pre-concentrate uranium. In St Alban mine, the ore was extracted but not treated. A study was carried out in the environment near the both sites up and downstream of the mine area. A sampling of soils, sediments and water have been realised in order to determine the trace metals concentration and repartition around the mine. Two wetlands localised upstream of the Bertholène mine have been sample too, to evaluate the trace metal distribution along the peat profile and the range of the impact of the mine activity. XRD, SEM-EDS and BCR Sequential Extraction were performed to determine trace metals repartition and forms. No contamination in trace metals is clearly visible around the mines with an Enrichment Factor lower than 2. Based on the sequential extraction, we show that As and V are mainly associated with residual phases while Pb is associated with Fe-Mn oxydes and residual phases in the contaminated and uncontaminated soils.

[1] Adriano (2001) Springer Verlag New York [2] Lottermoser *et al* (2005), *Environ. Geol.*, **48**, 748-761